

Listing of Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Amended) An apparatus for performing quality inspections on a test surface comprising:
a device for producing optical radiation having a plurality of different spectrum lines,
selecting at least one of the spectrum lines, and directing the selected spectrum line to the test surface; and
circuitry for detecting a current of photoelectrons emitted from the test surface,
generating a signal indicative of photoelectron current, and indicating a condition of quality based on the generated signal indicative of photoelectron current;
the indicating circuitry comprising an arrangement for evaluating the generated signal to thus distinguish between at least one of:
surface contamination and oxidation; and
different species of contaminants.
2. (Original) The apparatus according to claim 1 wherein the device comprises an ultraviolet optical radiation source.
3. (Original) The apparatus according to claim 2 wherein the ultraviolet optical radiation source comprises an ultraviolet laser.
4. (Original) The apparatus according to claim 3 wherein the laser comprises a tunable laser.
5. (Original) The apparatus according to claim 2 wherein the ultraviolet optical radiation source comprises an excimer lamp.

6. (Amended) ~~The~~ An apparatus according to claim 2 for performing quality inspections on a test surface comprising:

a device for producing optical radiation having a plurality of different spectrum lines, selecting at least one of the spectrum lines, and directing the selected spectrum line to the test surface;

circuitry for detecting a current of photoelectrons emitted from the test surface, generating a signal indicative of photoelectron current, and indicating a condition of quality based on the generated signal indicative of photoelectron current;

the device comprising an ultraviolet optical radiation source; and

wherein the ultraviolet optical radiation source comprises comprising a plurality of Microhollow Cathode Discharge lamps.

7. (Original) The apparatus according to claim 1 wherein the selecting device comprises a filtering device that filters the optical radiation directed to the test surface.

8. (Original) The apparatus according to claim 7 wherein the filtering device comprises a plurality of filtering sections, each filtering section allowing at least one particular spectrum line to pass therethrough.

9. (Original) The apparatus according to claim 8 wherein a first one of the plurality of filtering sections allows only a first spectrum line to pass therethrough, a second one of the filtering sections allows only a second spectrum line to pass therethrough, and a third one of the plurality of filtering sections allows only the first and second spectrum lines to pass therethrough.

10. (Amended) ~~The~~ An apparatus according to claim 9 for performing quality inspections on a test surface comprising:

a device for producing optical radiation having a plurality of different spectrum lines, selecting at least one of the spectrum lines, and directing the selected spectrum line to the test surface;

circuitry for detecting a current of photoelectrons emitted from the test surface, generating a signal indicative of photoelectron current, and indicating a condition of quality based on the generated signal indicative of photoelectron current;

the selecting device comprising a filtering device that filters the optical radiation directed to the test surface;

the filtering device comprising a plurality of filtering sections, each filtering section allowing at least one particular spectrum line to pass therethrough;

a first one of the plurality of filtering sections allowing only a first spectrum line to pass therethrough, a second one of the filtering sections allowing only a second spectrum line to pass therethrough, and a third one of the plurality of filtering sections allowing only the first and second spectrum lines to pass therethrough; and

wherein the filtering device has having a first state that enables only the first one of the filtering sections to filter the optical radiation, a second state that enables only the second one of the filtering section to filter the optical radiation, and a third state that enables only the third filtering section to filter the optical radiation.

11. (Original) The apparatus according to claim 10 wherein a fourth one of the plurality of filtering sections allows all spectrum lines to pass to the test surface, the filtering device further including a fourth state that allows only the fourth filtering section to filter the optical radiation.

12. (Original) The apparatus according to claim 8 wherein each of the filtering sections comprises diffraction gratings.

13. (Amended) An ~~The apparatus according to claim 8~~ for performing quality inspections on a test surface comprising:

a device for producing optical radiation having a plurality of different spectrum lines, selecting at least one of the spectrum lines, and directing the selected spectrum line to the test surface;

circuitry for detecting a current of photoelectrons emitted from the test surface, generating a signal indicative of photoelectron current, and indicating a condition of quality based on the generated signal indicative of photoelectron current;

the selecting device comprising a filtering device that filters the optical radiation directed to the test surface;

the filtering device comprising a plurality of filtering sections, each filtering section allowing at least one particular spectrum line to pass therethrough; and

~~wherein each of the filtering sections comprises~~ comprising a dielectric filter.

14. (Original) The apparatus according to claim 1 wherein the detecting circuitry includes a collector for collecting the photoelectron current and means for positively biasing the collector with respect to the test surface.

15. (Original) The apparatus according to claim 14 further comprising means for negatively biasing the collector with respect to the test surface to replace charges removed as photoelectron current from the test surface by the previously positively biased collector.

16. (Canceled)

17 (Amended). An apparatus for performing quality inspections on a test surface comprising:
means for producing optical radiation having a plurality of different spectrum lines,
selecting at least one of the spectrum lines, and directing the selected spectrum line to the test
surface; and

means for detecting a current of photoelectrons emitted from the test surface, generating a
signal indicative of photoelectron current, and indicating a condition of quality based on the
generated signal indicative of photoelectron current; and

the means for indicating a condition of quality being capable of distinguishing between:
surface contamination;
surface corrosion; and
different species of contaminants.

18. (Canceled)

19. (Canceled)

20 (Amended) ~~The~~ An apparatus according to claim 19 for performing quality inspections on a
test surface based on optically stimulated emission of electrons comprising:

an optical radiation source for producing optical radiation having a plurality of different
spectrum lines;

a selection device for selecting at least one of the spectrum lines and directing the
selected spectrum line to the test surface;

circuitry for detecting a current of photoelectrons emitted from the test surface and
generating a signal indicative of the detected photoelectron current;

circuitry for indicating a condition of quality based on the generated signal indicative of
photoelectron current, and

wherein the circuitry for indicating a condition of quality comprises circuitry for
evaluating the generated signal indicative of photoelectron current to thereby discriminate
between at least one of:

surface contamination and corrosion; and
different species of contaminants.

21. (Amended) An apparatus for performing quality inspections on a test surface comprising:
a multi-state device for producing optical radiation in the direction of the test surface, the optical radiation defining a particular spectrum line that corresponds to a particular state of the device wherein each state of the device effects generation of at least one particular spectrum line;
circuitry for successively configuring the device into different states; and
additional circuitry for detecting a current of photoelectrons emitted from the test surface, generating a signal indicative of photoelectron current, and indicating a condition of quality based on the generated signal indicative of photoelectron current; and
the indicating circuitry comprising an arrangement for evaluating the generated signal to thus distinguish between at least one of:
surface contamination and corrosion; and
different species of contaminants.

22. (Original) The apparatus according to claim 21 wherein the additional circuitry detects a current of photoelectrons emitted from the test surface for each state of the multi-state device, the additional circuitry including circuitry for combining the detected current of photoelectrons emitted from the test surface for each state of the multi-state device into a single detection signal, the additional circuitry being configured so that the indicated condition of quality is based upon the single detection signal.

23 - 40. (Canceled)

41. (Amended) An apparatus for performing quality inspections on a test surface comprising:
means for producing optical radiation having a continuum spectrum, selecting a band of
at least one wavelength from the continuum, and directing the selected band to the test surface;
and

means for detecting a current of photoelectrons emitted from the test surface, generating a
signal indicative of photoelectron current, and indicating a condition of quality based on the
generated signal indicative of photoelectron current; and

the means for indicating a condition of quality comprising means for distinguishing
between at least one of:

surface contamination;

surface oxidation; and

different species of contaminants.

42. (Amended) ~~The~~ An apparatus according to claim 41 for performing quality inspections on a
test surface comprising:

means for producing optical radiation having a continuum spectrum, selecting a band of
at least one wavelength from the continuum, and directing the selected band to the test surface;

means for detecting a current of photoelectrons emitted from the test surface, generating a
signal indicative of photoelectron current, and indicating a condition of quality based on the
generated signal indicative of photoelectron current; and

wherein the means for producing optical radiation comprising comprises a deuterium
lamp.

43. (Original) The apparatus according to claim 41 wherein the selecting means comprises a filtering
device that filters the optical radiation directed to the test surface.

44. (Original) The apparatus according to claim 43 wherein the filtering device comprises a plurality of
filtering sections, each filtering section allowing at least one particular spectrum band to pass
therethrough.

45. (Original) The apparatus according to claim 44 wherein a first one of the plurality of filtering sections allows only a first spectrum band to pass therethrough, a second one of the filtering sections allows only a second spectrum band to pass therethrough, and a third one of the plurality of filtering sections allows only the first and second spectrum bands to pass therethrough.

46. (Amended) An The apparatus according to claim 45 for performing quality inspections on a test surface comprising:

means for producing optical radiation having a continuum spectrum, selecting a band of at least one wavelength from the continuum, and directing the selected band to the test surface;

means for detecting a current of photoelectrons emitted from the test surface, generating a signal indicative of photoelectron current, and indicating a condition of quality based on the generated signal indicative of photoelectron current;

the selecting means comprising a filtering device that filters the optical radiation directed to the test surface;

the filtering device comprising a plurality of filtering sections, each filtering section allowing at least one particular spectrum band to pass therethrough;

a first one of the plurality of filtering sections allowing only a first spectrum band to pass therethrough, a second one of the filtering sections allowing only a second spectrum band to pass therethrough, and a third one of the plurality of filtering sections allowing only the first and second spectrum bands to pass therethrough; and

wherein the filtering device has having a first state that enables only the first one of the filtering sections to filter the optical radiation, a second state that enables only the second one of the filtering section to filter the optical radiation, and a third state that enables only the third filtering section to filter the optical radiation.

47. (Original) The apparatus according to claim 46 wherein a fourth one of the plurality of filtering sections allows all spectrum bands to pass to the test surface, the filtering device further including a fourth state that allows only the fourth filtering section to filter the optical radiation.

48. (Original) The apparatus according to claim 44 wherein each of the filtering sections comprises diffraction gratings.

49. (Amended) ~~An~~ The apparatus according to claim 44 for performing quality inspections on a test surface comprising:

means for producing optical radiation having a continuum spectrum, selecting a band of at least one wavelength from the continuum, and directing the selected band to the test surface;

means for detecting a current of photoelectrons emitted from the test surface, generating a signal indicative of photoelectron current, and indicating a condition of quality based on the generated signal indicative of photoelectron current;

the selecting means comprising a filtering device that filters the optical radiation directed to the test surface;

the filtering device comprising a plurality of filtering sections, each filtering section allowing at least one particular spectrum band to pass therethrough; and

wherein each of the filtering sections comprises comprising a dielectric filter.

50. (Original) The apparatus according to claim 41 wherein the detecting means includes a collector for collecting the photoelectron current and means for positively biasing the collector with respect to the test surface.

51. (Original) The apparatus according to claim 50 further comprising means for negatively biasing the collector with respect to the test surface to replace charges removed as photoelectron current from the test surface by the previously positively biased collector.

52. (Canceled)

53. (Original) The apparatus according to claim 48 wherein each of the diffraction gratings comprise a slit, thereby permitting the at least one particular spectrum band to pass therethrough.